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PHOTOGRAPHIC INTELLIGENCE REPORT

CRATERING EVENT AT LAUNCH COMPLEX D
TYURATAM MISSILE TEST CENTER (TTMTC), USSR

DECLASS REVIEW by NIMA/DOD

CIA/PIR 63052

DATE MAY 1966

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FIGURE 1. LOCATION MAP, TYURATAM MISSILE TEST CENTER (TTMTC)

CRATERING EVENT AT LAUNCH COMPLEX D
TYURATAM MISSILE TEST CENTER (TTMTC), USSR

SUMMARY

Photographic evidence indicates that the crater at Launch Complex D2 of the Tyuratam Missile Test Center (TTMTC) is the result of a surface or a shallow subsurface detonation of a large quantity of high explosives. The primary purpose of the high explosives detonation appears to have been the determination of the hardness of a three-silo ICBM site. The cratering event occurred between [redacted]. The chronological development of the site, as evidenced on photography, indicates a possible relationship between the crater and the acoustic event which occurred on [redacted] 1. A study of a high explosives storage site, constructed to store explosives for the cratering event, indicates that the site has a probable safe storage capacity of approximately 500 tons of TNT.

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INTRODUCTION

The presence of a large crater at Launch Complex D of the Tyuratam Missile Test Center (TTMTC) was first detected on photography of [redacted].

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Launch Complex D consists of Launch Sites D1 and D2, an "L" shaped interferometer, an electronic facility and a probable instrumentation/observation site. Launch Site D1 was first observed in the initial stages of construction in [redacted]. It was completed in the fall of 1962. Site D1 is a hardened mode, R&D and operational prototype launch site for the SS-7 ICBM. Launch Site D2 is an R&D prototype hardened launch site for the SS-9 ICBM. Construction of Site D2 began in the fall of 1962 and was completed in the fall of 1964.

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Launch Complex D is approximately 18 nautical miles (nm) ENE of Launch Complex H at the TTMTC and is the easternmost launch complex at the center.

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CHRONOLOGY OF EVENTS

RELATED TO THE CRATER AT LAUNCH COMPLEX D2, TIMPC

Photography indicates that preparations for the high explosives (HE) effects test at D2 probably began in [redacted]. On the photography of [redacted] a pentagonal covering (possibly earthen) was being placed over the center silo at D2 (see Table I). The removal of buildings in Launch Complex D began between [redacted] the majority of buildings in the complex had been removed.

On the photography of [redacted] an HE storage site was observed in the initial stages of construction and the covering over the center silo at D2 was complete. (Figures 3 and 4, Tables 1 and 2)

Several significant changes were visible on the photography of [redacted]. By this time the HE storage site was complete and at least 10 of the storage pads appeared to be occupied. The road into the site of the crater had been constructed, and the small arched-roof building at the eastern end of the loop road which surrounds the launch silos was being earth-covered. In addition an instrumentation cable had been laid out in a northeast direction from the crater site. (Figures 3 and 4, Table 2)

On photography of [redacted] all the pads in the HE storage site were occupied. The eastern arched-roof building was completely earth-covered and 5 SAM-type revetments and at least an additional 12 revetments of various configurations had been constructed. In addition two new earth-covered structures, possibly bunkers, were identifiable east of the fenced area of D2. (Figures 3 and 4, Table 2)

The crater was first visible on photography of [redacted]. At this time the center section of the large unidentified building near the entrance to the site appeared to be either partially destroyed or partially dismantled. Possible coverings (tarpaulins) are visible on this coverage in a corner of the HE storage site, and all the storage pads appear empty.

As the above chronology indicates the HE effects test was conducted between [redacted]. Since all the pads of the HE storage site contained explosives on [redacted] and since the earth-covered structures, revetments and instrumentation cable were in place at that time, it appears that the test could account for the acoustic event which was recorded on [redacted]. It should be noted however that the acoustic event was reported to have occurred at 45-42N 65-18E, which is approximately 57 nm ESE of Launch Complex D.

The silos at D2 have been numbered from 1 to 3 (as indicated on Figure 4), in an east to west direction. Silo 1 has been observed in an open configuration on at least 3 and possibly 4 occasions since [redacted]. Silo 2 has had an earthen covering in place over it during the same period, and Silo 3 has only been observed in a closed configuration (see Table 1).

TABLE I

POSITION OF SILO COVERS



- * In the process of being covered.
- * Pentagonal covering, possibly earth in place.
- * (UTD) Unable to determine position of silo cover due to cloud shadow.

Table 2 indicates the dates on which changes were observed in selected items, some of which are identified by item numbers in Figure 3.

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TABLE 2
CHANGES IN SELECTED ITEMS IN THE VICINITY OF AREA D2

ITEM	ANNO. NO.	FUNCTION	DATE OF CHANGE	REMARKS
1	5	Unidentified		Earth-covered structure first visible
2	6	Unidentified		Earth-covered structure first visible
3	24	Missile Ready Bldg.		Arched roof bldg. being earth-covered
4	29	Center Silo		Being covered
5	34	Unidentified		Removed
6	35	Unidentified		Removed
7	36	Unidentified		Removed
8	38	Unidentified		Partially removed or destroyed
9	39	Unidentified		Removed
10	40	Unidentified		Removed
11	41	Housing		Removed
12	42	Housing		Removed
13	43	Housing		Removed
14	44	Housing		Removed
15	45	Housing		Removed
16	46	Housing		Removed
17	47	Housing		Removed
18	48	Housing		Removed
19	49	Housing		Removed
20	50	Housing		Removed
21	51	Messhall		Partially dismantled
22		Instrumentation		First visible
23		Cable		
23		Road		Road to crater site
24		HE Storage		HE storage site first visible
25		HE Stack Coverings		Removed from pads



FIGURE 2. CRATER AT LAUNCH SITE D2, TTMT

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ELECTRONIC FACILITY

PROBABLE INSTRUMENTATION/OBSERVATION SITE

AREA D1

51

45

47

50

45

46

43

44

41

42

CRATER

AREA D2

INTERFEROMETER

- Road
- - - Fence
- - - Abandoned fenceline
- ▨ Earth mounding
- Earth mound/unidentified object
- Building
- Instrumentation
- Probable instrumentation
- Revetment
- Small probable revetments

R & indicates change since

FIGURE 3. CHANGES IN THE IMMEDIATE VICINITY OF AREA D2, TTMT

- 4 -

ANNOTATION NO	DISTANCE FROM CRATER CENTER (IN FEET)	ANNOTATION NO	CRATER CENTER (IN FEET)
1*	3,350	32	1,135
2*	5,025	33	
3*	6,700	34*	1,740
4*	10,050	35*	1,695
5*	2,065	36*	1,625
6	2,065	37*	1,420
7	1,690	38*	1,450
8	1,550	39*	1,170
9	1,625	40*	1,095
10	1,530	41*	3,130
11	1,365	42*	3,130
12	1,770	43*	3,200
13	1,560	44*	3,225
14	1,400	45*	3,350
15	730	46*	3,495
16	1,115	47*	3,410
17	1,065	48*	3,820
18	816	49*	3,690
19	910	50*	3,930
20	830	51*	3,915
21	830	52*	4,300
22	725	53*	4,550
23	650	54	4,820
24	770	55*	5,030
25	342	56	7,720
26	955	57	8,200
27	650	58	
28	800	59	2,740
29	935	60	3,380
30	1,080	61	4,410
31	1,595		

*Approximate Distance

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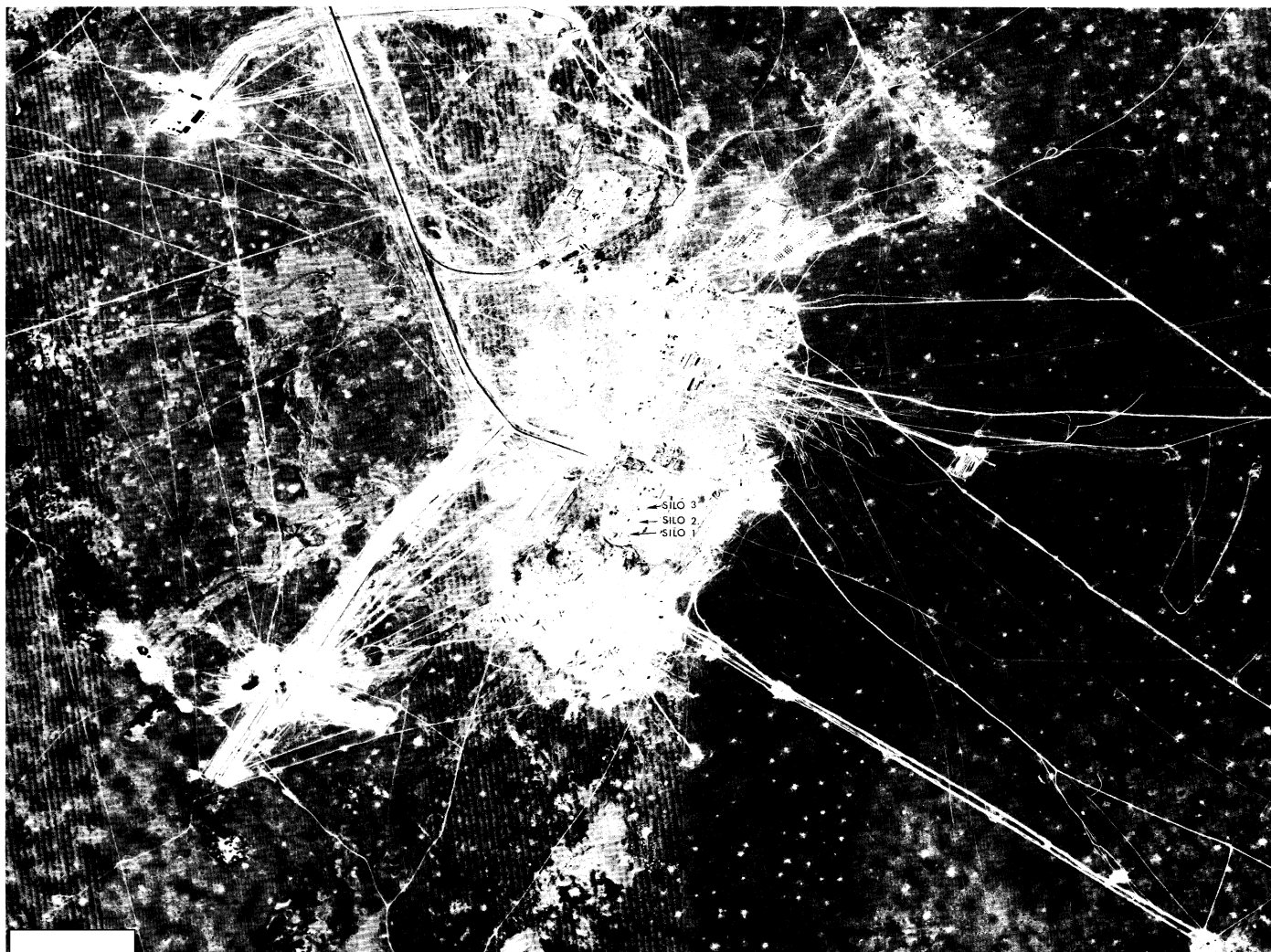
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FIGURE 4. LAUNCH COMPLEX D, TTMTC

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THE HIGH EXPLOSIVES STORAGE SITE

Construction activity was first visible at the high explosives storage site on photography of [redacted]. The site appeared essentially complete on [redacted] (Figure 5)

The storage site was laid out in a rectangular area approximately 2900 by 2200 feet. All vegetation has been removed or cut down within the site as a fire precaution and possibly for security purposes. The facility is secured by a double fence. Guard towers are located at each corner and at two midway points along the fence line. Only two small structures are present within the site. There are 17 platforms placed on earth pads along the internal road system. It appears that an eighteenth possible pad was not completed, or, if completed, possibly not used. (Figure 6, Pad 1)

Using domestic safety manuals and quantity-distance tables, an estimate has been made of the amount of HE which could safely be stored in the site. 2.3/ Table 3 in Figure 6 gives the distance from the center of each pad to the pad closest to it (minimum spacing) and the distance from the center of each pad to the center of all other pads. Since explosive safety distances are normally measured from the nearest outside point of a stack of explosives to the nearest outside point of any other stack under consideration (rather than from center to center) the smaller amount of explosives listed in Table 4 for each manual is probably the more realistic figure. The quantity-distance tables indicate a safe storage capacity of .475 kt to .912 kt.

The two small structures annotated on Figure 6 and mentioned earlier may house detonators. The dark objects in the SW corner of the site were first visible after the explosive event and may be material (tarpaulin) used to cover the explosive stacks. The storage site is connected to Area D2 by a good road, and it is located approximately 6.3 nm SW of the crater.

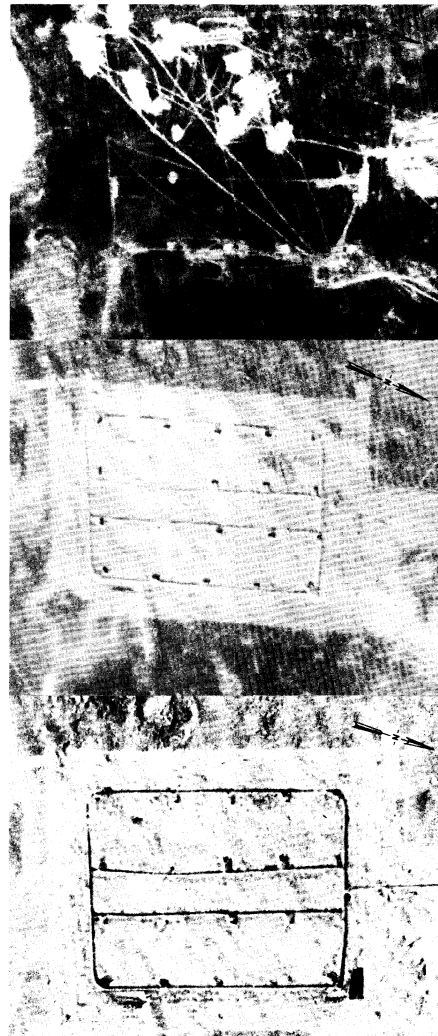
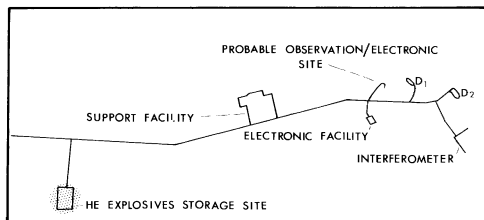


FIGURE 5. DEVELOPMENT OF HE STORAGE NEAR LAUNCH COMPLEX D, TTMT

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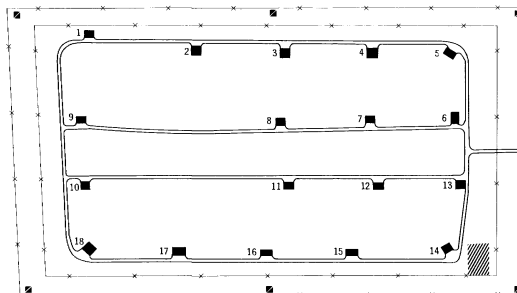
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- Road
- x- Fence
- Storage pad
- ▨ Possible tarpaulin storage
- Security guard tower

FIGURE 6. LAYOUT OF HE STORAGE SITE NEAR LAUNCH COMPLEX D, TMTD

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TABLE 4

EXPLOSIVE STORAGE, QUANTITY-DISTANCE RELATIONSHIPS

PAD NO.	MINIMUM BLDG SPACING	APM 127-100		TM 9-1910	
		LES (OVER)	LES (NOT OVER)	LES (OVER)	LES (NOT OVER)
1		100,000	125,000	100,000	125,000
2		60,000	70,000	50,000	100,000
3		60,000	70,000	50,000	100,000
4		40,000	50,000	50,000	100,000
5		40,000	50,000	50,000	100,000
6		50,000	60,000	50,000	100,000
7		50,000	60,000	50,000	100,000
8		50,000	60,000	50,000	100,000
9		50,000	60,000	50,000	100,000
10		50,000	60,000	50,000	100,000
11		50,000	60,000	50,000	100,000
12		50,000	60,000	50,000	100,000
13		50,000	60,000	50,000	100,000
14		70,000	80,000	50,000	100,000
15		60,000	70,000	50,000	100,000
16		60,000	70,000	50,000	100,000
17		60,000	70,000	50,000	100,000
18		70,000	80,000	50,000	100,000
TOTAL LES		1,020,000	1,135,000	950,000	1,825,000
TOTAL KT		.510	.567	.475	.912

SITE INSTRUMENTATION AND REVETMENTS

The main instrumentation feature at Launch Area D2 is a buried instrumentation cable which extends out to a distance of approximately 10,050 feet in a northeast direction from the crater center (Figure 8). Three equally spaced instrumentation positions are located along this buried cable at distances of approximately 3350 and 5025 and 6700 feet from the crater center. Adjacent to and west of the end of the cable is a small unidentified structure. Four other probable instrumentation points are visible, two of these are in line with the crater center. A tall structure, possibly a photographic station, is observed just outside the security fencing and east of the buried cable (Figure 7). There are 5 circular revetments in the vicinity of D2. These circular revetments closely resemble SA-2 (SAM) revetments in appearance, but are larger in diameter than the average size SAM revetments. There are at least 15 other revetments varying in shape and size at D2. Within Launch Area D2 there are linear arrangements of vertical poles in at least two places (see Figure 8). One group of these poles may have supported additional instrumentation for the test; however, the small scale of the photography of missions prior to the test event precludes a comparative study and a definitive determination of the function of these poles.

CRATER COMPARISONS

In Table 5 the crater at Launch Complex D2, TTMFC, is compared with Crater 24F at the Semipalatinsk

The [] crater was the result of an effects test conducted in the summer of 1964, and Crater 24F was the result of a test conducted between []

The soil types in the area of D2 and 24F appear to be similar and are probably sandy loams or sand. [] was a dry clay with an underlying aquifer. The craters at D2 and 24F remained free of water after testing whereas []

[] 4/ Quantity-distance figures for the storage area near Launch Complex D indicate the possible use of 500-ton HE charge at D2. A comparison of the photography from [] with the photography of earlier missions reveals a general leveling of the land in the vicinity of the site of the crater and the area immediately northeast of it (Figure 8). At the time of [] all the revetments in the area of D2 were complete, and the eastern arched-roof building (Item 24, Figure 3) was earth-covered. There were no indications that an underground cavity had been excavated, and since all the explosive pads in the HE storage site were occupied, the explosive had not been placed in a surface pit and earth-covered.

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FIGURE 7. OBLIQUE VIEW OF AREA D2, TTMTc

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It is estimated that a subsurface cavity large enough to contain 500 tons of TNT would produce well over 10,000 cubic feet of spoil. 5/ On photography subsequent to [] no evidence of a quantity of spoil this large appeared at D2. Therefore using criteria other than crater dimensions (crater dimensions are discussed in a following paragraph), it appears that the test at D2 which used an HE charge occurred either on the surface or several feet below ground level. A positive determination concerning the source of energy (HE or nuclear) used to produce the crater at 24F has not been made. However, the cratering event was considered to be in the subkiloton range.

The diameters of the [] The variation in depth is proportionately somewhat greater, [] event being the shallowest. The shallow depth might be partially explained by the more plastic media in which the event occurred.

TABLE 5
COMPARISON OF CRATERS

CRATER	DIAMETER (FT)	DEPTH ¹ (FT)	YIELD (KT)
D2	[]	[]	.510 ³
GZ 24F	[]	[]	Subkiloton
[]	[]	[]	[]

- 1 Measurements from pre-shot ground level.
- 2 Crater has an irregular outline and thus a varying diameter.
- 3 Based on quantity-distance measurements of HE storage site.
- 4 Crater 24F was elliptical in shape, Minor Axis - 170'
- 5 PI Estimate.

INSTRUMENTATION AT D2, 24F, []

The instrumentation and revetments at D2 and 24F are similar. In both cases there exists a main instrumentation cable. In the case of D2 the cable length is approximately 10,050 feet, and in the case of 24F the cable length is approximately 7000 feet. In both cases the cable ends near a small structure. Similar revetments are also observed at D2 and 24F although the revetments are more numerous at D2. The openings of the majority of the revetments at both D2 and 24F are oriented perpendicular to a line drawn from the crater center to the center of the revetment. There are no instrumentation points at D2 which are similar to the 4 in-line probable instrumentation points 2000 feet west of 24F. A direct comparison of the instrumentation at D2 and 24F was not carried out since []

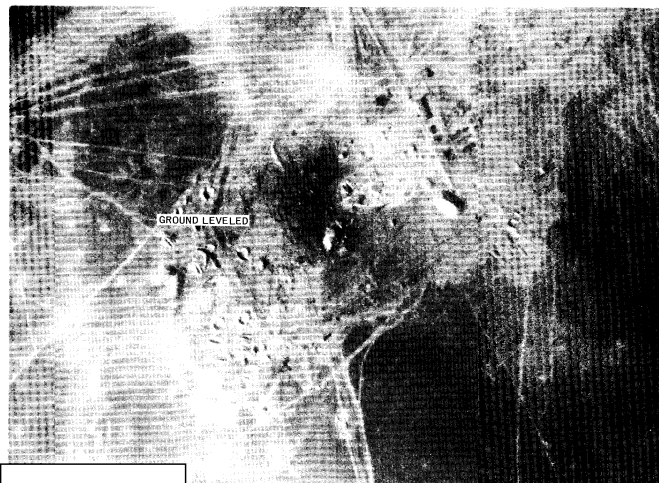


FIGURE 8. EVIDENCE OF GROUND LEVELING AT AREA D2 CRATER SITE, TTMTG

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FIGURE 10. TOPOGRAPHY OF CRATER AT LAUNCH AREA D2, TTMT

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REFERENCES

MAPS

AMS. Series DESPA-2, Sheet NL 41A/4, Tyuratam 4, USSR, scale 1:50,000, Edition 1, October 1964. TOP SECRET

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DOCUMENTS

1. APTAC/TDS (AR 66-3), 28 January 1966. (SECRET)
2. AFM 127-100, Explosives Safety Manual, 20 April 1964, Department of the Air Force. (UNCLASSIFIED)
3. TM 9-1910, Military Explosives, April 1955, Departments of the Army and the Air Force. (UNCLASSIFIED)
4. Minutes of Meeting to Discuss Technical and Administration Arrangements for the 500 Ton TNT Trial, to be held at Suffield Experimental Station in July 1964, 18 April 1963, Suffield Experimental Station, Ralston, Alberta. (UNCLASSIFIED)
5. IC Bureau of Mines Information Circular 8091, A Study of Mine Examination Techniques for Detecting and Identifying Underground Nuclear Explosions, by the Staff, Bureau of Mines, United States Department of the Interior, 1962. (UNCLASSIFIED)

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